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ABSTRACT

This module provides information about plastics, focusing on the uses of plastic bags in particular. Topic areas considered include: (1) making plastic bags; (2) transparency of plastic bags; (3) plastic bags and food odors; (4) food containers (before and since plastics); and (5) disposing of plastic bags and other plastic products. The text is illustrated by numerous line drawings and cartoons. (JN)

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Plastic, Fantastic?



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PLASTIC, FANTASTIC?

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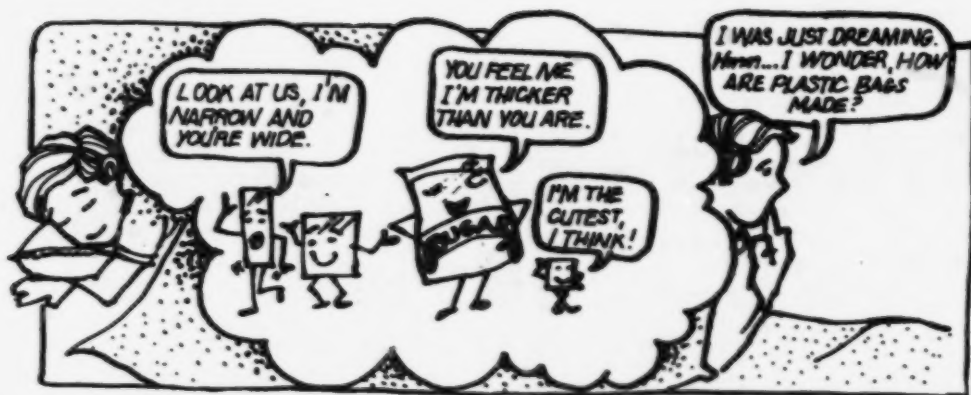
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Plastic, Fantastic?

Here, There, Everywhere



When Plastic Bags Come Alive At Midnight



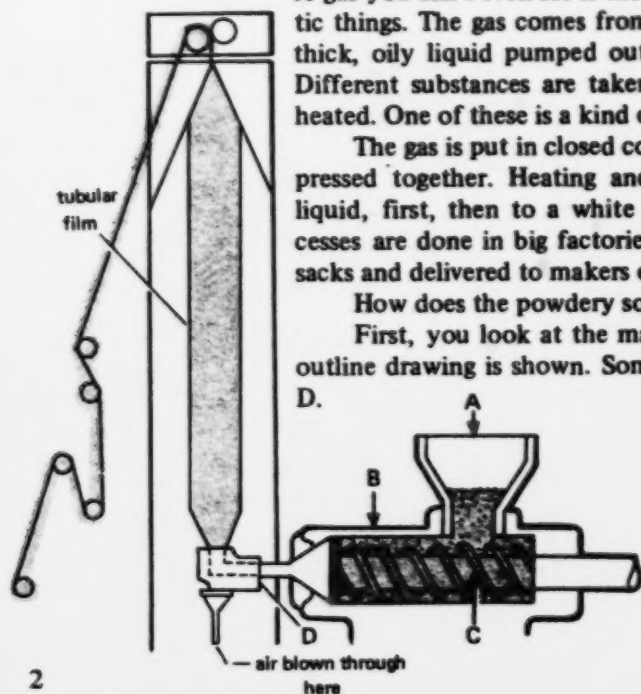
To Make Plastic Bags

A gas you can't even see is the starting material of many plastic things. The gas comes from petroleum which is the black, thick, oily liquid pumped out from underground oil pools. Different substances are taken from petroleum when this is heated. One of these is a kind of gas.

The gas is put in closed containers where it is heated and pressed together. Heating and pressing changes the gas to liquid, first, then to a white powdery solid. All these processes are done in big factories. The powdery solid is put in sacks and delivered to makers of plastic containers.

How does the powdery solid become plastic bags?

First, you look at the machine that makes the bag. An outline drawing is shown. Some parts are labeled A, B, C and D.



The powdery solid is poured into the funnel-shaped part labeled A. Then it goes to the heated chamber (B). The heat changes the plastic into a thick liquid.

The screw (C) turns continuously. It pushes the liquid plastic material into the hole (D) at the end of the heated chamber.

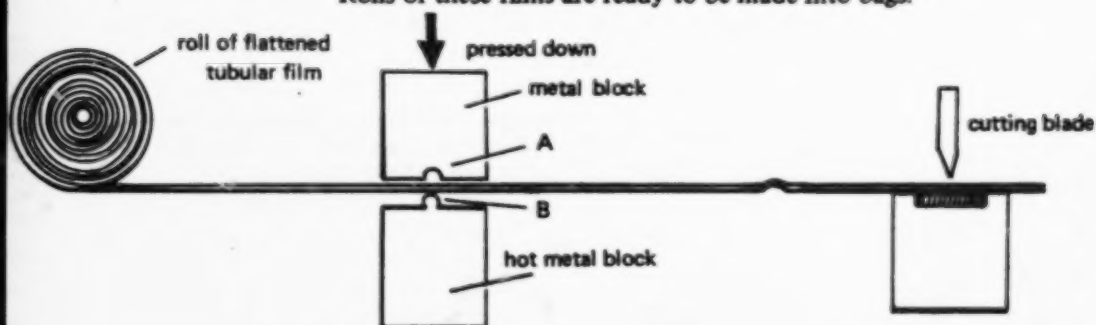
Air is blown into the melted plastic as it comes through the hole.

The size of the hole controls the width of the tubular film.



What Is Done With The Tubular Film?

The long tubular film is flattened and rolled.
Rolls of these films are ready to be made into bags.



The tubular film is pressed down on the heated metal block. The film melts at the point where part A meets the hot part B of the machine. Melted plastic is sticky. Upon cooling, the melted part becomes hard again. The inner surfaces of the film are now stuck or welded together.

Another part of the machine cuts the film across the width.

The bags are arranged in piles as they are cut. They are bundled and ready to be sent to stores where people can buy them.



Why do people use plastic bags?

You Can See Through Plastic Bags



Bread in plastic bag. Chicken in plastic bag.

When you get these in markets, you see what you are buying.

What other things are placed in plastic bags so that people will see them?

Do clear plastic bags remain transparent?

Get a new plastic bag. Look at an object through it.

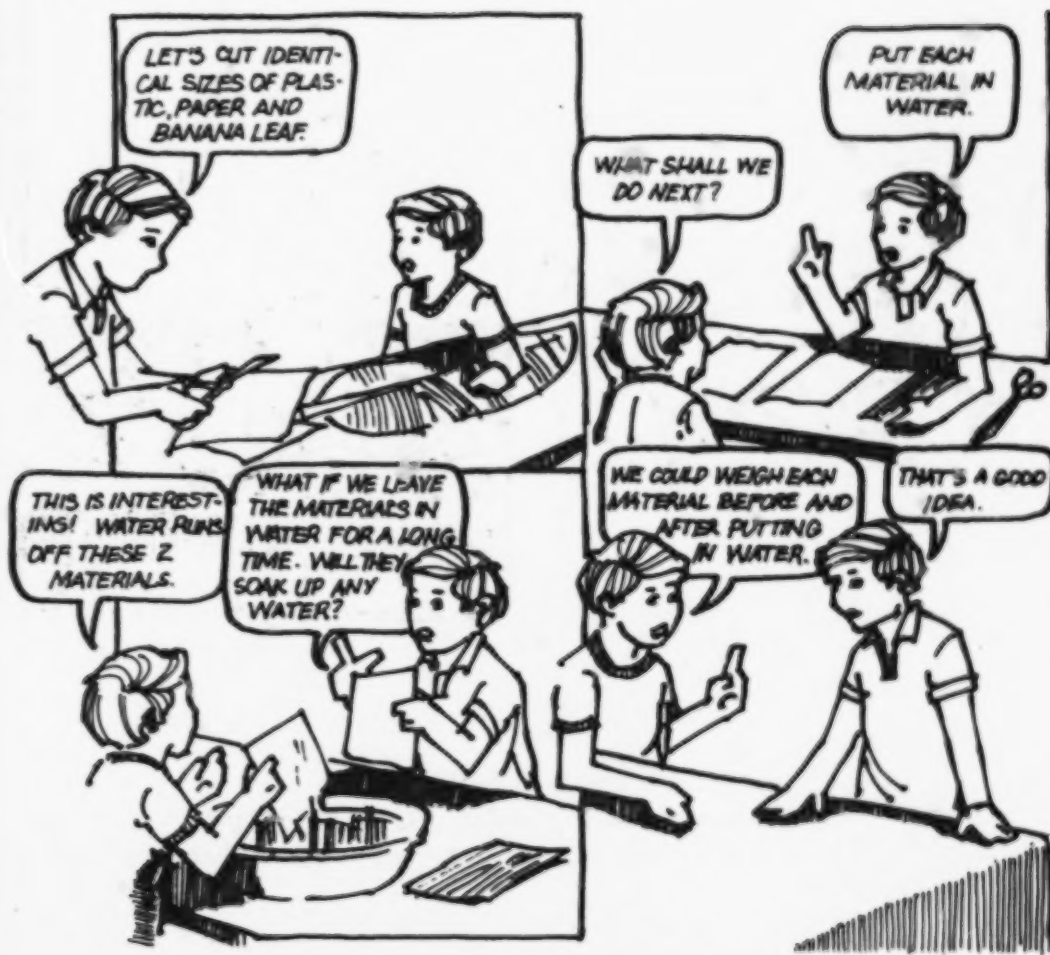
Fold the bag and look at the same object. Does the object look the same as before?

If you continue folding, how many layers can you see through?

What else besides thickness affects the transparency of the plastic? Are you thinking of scratches, dirt and grease?

How would you test the effect of these factors?

Strong Even When Wet



How do you like to try what the two kids are doing?
And here's something else.
Bury identical sizes of the three materials under a few centimeters of soil. Keep the soil moist.
After several weeks. . .
Which material disappears fastest? next? last?
Which material is strong even when wet?

Food Odors and Plastic Bags

Enrico and Farah brought sandwiches for their snacks. Enrico did not want to eat his sandwich because it smelled of onions. The plastic bag for the sandwich had been used before for onions.



Enrico wondered what other foods would leave their smell behind. He and Farah decided to do an experiment.

They got a ripe guava, a piece of *langka*, one *lakatang saging* and one dried fish. They put each of these strong-smelling foods in a plastic bag. They let one night pass. The next morning, they removed the foods from the bags and washed each bag. They smelled each one, then put a piece of cake in all of them. They also put cake in unused plastic bags. They left these bags of cake overnight. The next morning, Enrico and Farah were excited. Their friends who volunteered to taste were also excited. They tasted the cakes in used and unused plastic bags.



Which of the foods left their smell behind?

Which pieces of cake smelled and tasted like the food that was put in the same plastic bag before? HOW DO YOU LIKE TO TRY THAT EXPERIMENT?

How do plastic bags get the smell of foods?

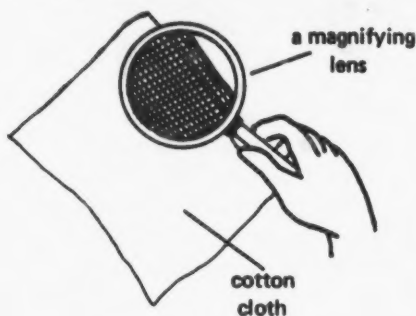
Foods have liquids in them. Dissolved in the liquid are certain substances. Particles of these substances evaporate. Some particles stick to the inner surface of the bag. Other particles escape out of the bag. These particles are what we smell.

Invisible Holes

Plastic bags are waterproof. They are airtight, too – well, almost airtight. This is because plastic bags have holes all over. How is this?

Imagine that you are looking at a fishnet from afar. The net looks like one solid piece of material. Then you get nearer and find that the net is mostly holes.

A piece of cotton cloth looks like one solid piece of material. But when you look at it with a magnifying lens, then with a microscope you will see something like this:



A plastic bag, too, has holes. But these holes are very small. They cannot be seen even when a microscope is used.

The holes are so small that they do not let water pass through. That is why we can put water or oil in a plastic bag.

But these tiny holes let odors of strong smelling foods pass through. So, even if wrapped in plastic we can smell foods like dried fish.

Similarly, people put in a plastic bag things they do not want to get wet even when lots of water fall on it. Are you thinking of sugar, salt, mongo, dried fish?

Now try this –

Catch some air in a plastic bag. Twist the bag closed. Hold it closed with a rubber band. Put an object on the blown-up bag. Does the bag hold the object up?





A big blown-up bag may hold a person up in the water much like a blown-up tire tube, or a wooden raft.

Why? The reason is that plastic bags are almost airtight. Slowly the bag will get smaller. Some gases in air can pass through the holes of the plastic bag even if it is sealed.

Food Containers — Before and Now

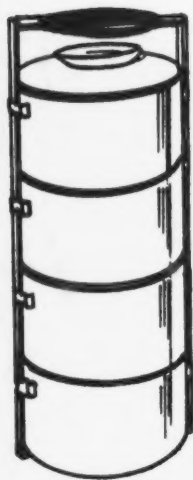
In a school

It is a day in the 1960's. The bell rings. It is time for lunch. A pupil brings her lunch to the canteen: rice, fish and tomatoes. These are wrapped in a piece of banana leaf. A classmate with her lunch of rice, also wrapped in banana leaf, soon joins in. She has brought "ginisang mungo" in a small glass jar.

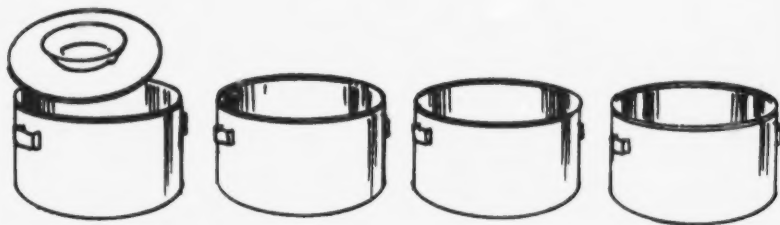
It is another school day. During lunch several pupils are seated together at a table. They are eating from plastic bowls and bags. The time is *today*.

In an office

Several years ago, lunch orders of employees were brought in enamel containers called *piambreras*.



a stack of
piambreras



Nowadays food is brought mostly in plastic bags. Banana leaves, glass jars and *piambrera* are still used sometimes. Why are more and more plastic bags being used today? Let's find out.

These days ----



Many years ago ----



Wanted: Plastics That Decay

Scientists have succeeded in making durable plastic articles. But this success has resulted in plenty of used plastics in garbage.



Scientists are looking for ways of making plastics decay. Of course scientists will have to make sure that such plastics will decay at the right time.



Scientists say that the best plastic is one which starts to weaken as soon as it is thrown in the garbage.

Perhaps something that will start this action is needed.

How does a material like paper start to decay?

Will paper decay if it is dry?

Can bacteria and molds feed and multiply on paper that is dry?

The reason paper (in garbage dumps) decays is, first, it absorbs water. Then, the moist paper is rapidly attacked by bacteria. These bacteria change the paper into simple substances that mix with the soil.

Plastic does not absorb water. It is waterproof. What, then, might make plastics decay or break down?

Scientists are experimenting on chemicals which, with sunlight, might cause plastics to break down. They are also looking for certain bacteria which would eat plastics.

Recycling Plastics?

Scientists are trying to make plastics that will decay through the action of sunlight, microorganisms and some chemicals.

What do you think of the idea?

Perhaps you wonder if the substances that result from the breakdown are safe? They may be poisonous.

In the meantime, what shall we do with used plastic bags?

These scenes are familiar to you.



You have probably seen this signboard, too.



But have you heard of anyone buying or trading used plastic bags?

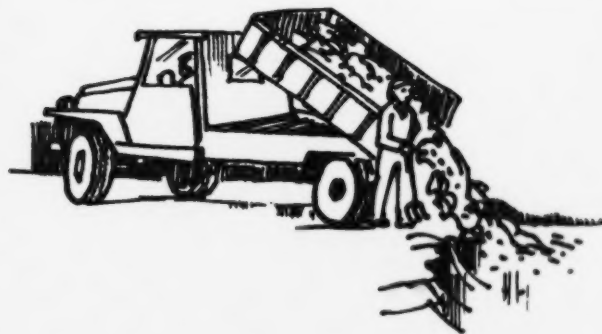
Glass bottles, old newspapers and clothes can be used over and over again. They can be made into new bottles, paper and clothes. This is recycling.

Some plastic things are being recycled into other objects.

But it's hard to imagine plastic bags being recycled.

In the meantime, what will people do with used plastic bags?

USE THEM AS LANDFILL?



Scientists say ---

- Plastic garbage is good material for filling land. Since plastics do not decay, they keep the ground firm.
- Plastic garbage doesn't pollute the ground since it is not affected by rain or chemicals in the air or soil.



Increasing population needs more land space for building their homes. Cities may have to look for dumping places far, far away. And the plastics, though buried, do not rot and disappear.

BURN THEM?



You know that you have to breathe in the air that other people may be polluting.

What could you say to these people in a nice way that might make them stop? Or could make them think about what they are doing?

CLEAN AND REUSE THEM?

WHAT ARE YOU
GOING TO DO
WITH THOSE
BAGS?

CLEAN THEM!
THEY CAN STILL BE
USED FOR WRAPPING
FOOD.

MOTHER, I CAN'T
WASH OFF THE SMELL
OF FISH FROM THIS
BAG.

I HAVE USED MUCH
SOAP AND WATER ON
THIS PLASTIC BAG. THE
OIL FROM THE "ADOBO"
WON'T COME OFF.

YOU CAN
ONLY WASH
AWAY SOME
OF THE OIL.

I CLEANED THIS
PLASTIC BAG VERY
WELL, BUT LOOK!

YES, IT'S NOT
AS CLEAR AS
A NEW ONE.

Cleaning plastic bags with soap and water may take out much of the odor of some foods. But if used and cleaned repeatedly, the soft surface is easily scratched. Germs may settle in these scratches.

When we buy eating utensils like drinking glasses, spoons or plates we wash them before using. We do not do the same with plastic bags.

Since plastic bags are not clean unless they are washed, should we use them for food which is not washed or cooked before eating?

Should we use them for drinks?

IT'S EASY, BUT...



Iced candy wrappers, and plastic bags –
What do you do with them?

Throw them on the street, on the park, on the playground? It's easy to do so. It's easier than walking to the garbage can. It's easy to litter.

But it's also easy to see that used plastics or any garbage make the surroundings untidy. They attract germs and animals that carry germs. They clog street drains.

THINK ABOUT THIS

You have learned the things that are good about plastic bags. And the things that are bad, too.

We use plastic bags for almost anything, even for foods that are ready to eat!

Might problems about piling up of plastic garbage become less—

- if we use less plastic?
- if we use more of other food wrappers and containers like banana leaves, glass jars or *piambreras*?

Used banana leaves in garbage easily decay, and even make the soil fertile. Glass jars and *piambreras* can be used again and again. And we wash these containers with soap and water before using, don't we?

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